

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

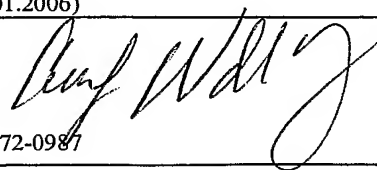
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 325.0253PCT		FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/US04/26926	International filing date (day/month/year) 18 August 2004 (18.08.2004)	Priority date (day/month/year) 20 January 2004 (20.01.2004)	
International Patent Classification (IPC) or national classification and IPC IPC(7): B01D 53/14 and US Cl.: 95/187, 223, 235; 96/234; 423/220			
Applicant FLUOR TECHNOLOGIES CORPORATION			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>3</u> sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 03 November 2005 (03.11.2005)		Date of completion of this report 19 January 2006 (19.01.2006)	
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer Frank M. Lawrence  Telephone No. 571-272-0987	

Form PCT/IPEA/409 (cover sheet)(April 2005)

**Box No. I Basis of the report**1. With regard to the **language**, this report is based on:

- ☒ the international application in the language in which it was filed.
- ☐ a translation of the international application into English, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4(a))
- ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- ☐ the international application as originally filed/furnished
- ☒ the description:  
pages 1-17 as originally filed/furnished  
pages\* NONE received by this Authority on \_\_\_\_\_  
pages\* NONE received by this Authority on \_\_\_\_\_
- ☒ the claims:  
pages NONE as originally filed/furnished  
pages\* 18-20 as amended (together with any statement) under Article 19  
pages\* NONE received by this Authority on \_\_\_\_\_  
pages\* NONE received by this Authority on \_\_\_\_\_
- ☒ the drawings:  
pages 1/7-7/7 as originally filed/furnished  
pages\* NONE received by this Authority on \_\_\_\_\_  
pages\* NONE received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☒ the claims, Nos. 14
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.  
PCT/US04/26926**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

## 1. Statement

Novelty (N)	Claims <u>1-13, 15-17</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>1-13, 15-17</u>	YES
	Claims <u>NONE</u>	NO
Industrial Applicability (IA)	Claims <u>1-13, 15-17</u>	YES
	Claims <u>NONE</u>	NO

## 2. Citations and Explanations (Rule 70.7)

Claims 1-13 and 15-17 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a plant comprising a first absorber coupled to a regenerator, wherein the absorber is configured to promote absorption of H<sub>2</sub>S using a solvent and wherein the regenerator is configured to promote formation of a H<sub>2</sub>S-rich gas from the solvent, a second absorber coupled to the regenerator, wherein a portion of the H<sub>2</sub>S-rich gas is fed to the second absorber to increase a H<sub>2</sub>S concentration in the H<sub>2</sub>S-rich gas, and wherein the first and second absorbers are configured to produce an overhead product that is enriched in CO<sub>2</sub> and depleted in H<sub>2</sub>S. The prior art also does not teach or fairly suggest a process for carrying out the separation, wherein the step of combining the first and second H<sub>2</sub>S-enriched solvents comprises feeding at least part of the first solvent into the second absorber, or comprising a step of feeding a second portion of the H<sub>2</sub>S-rich product gas to a Claus plant.

Claims 1-13 and 15-17 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----

## CLAIMS

What is claimed is:

1. A plant comprising:  
a first absorber fluidly coupled to a regenerator, wherein the first absorber is configured to promote absorption of hydrogen sulfide by a hydrogen sulfide-selective solvent, and wherein the regenerator is configured to promote formation of a hydrogen sulfide-rich gas from the hydrogen sulfide-selective solvent;  
a second absorber fluidly coupled to the regenerator, wherein a portion of the hydrogen sulfide-rich gas is fed to the second absorber to thereby increase a hydrogen sulfide concentration in the hydrogen sulfide-rich gas; and  
wherein the first and second absorbers are configured to produce an overhead product that is enriched in carbon dioxide and substantially depleted in hydrogen sulfide.
2. The plant of claim 1 wherein the first and second absorbers produce a first and second hydrogen sulfide-enriched solvent, and wherein the first and second hydrogen sulfide-enriched solvents are combined.
3. The plant of claim 1 wherein the first and second absorbers produce a first and second hydrogen sulfide-enriched solvent, wherein the first and second hydrogen sulfide-enriched solvents are combined, and wherein the second absorber receives at least a portion of the combined hydrogen sulfide-enriched solvents.
4. The plant of claim 1 wherein the first absorber produces a first hydrogen sulfide-enriched solvent, and wherein the second absorber receives at least a portion of the first hydrogen sulfide-enriched solvent.
5. The plant of claim 1 wherein another portion of the hydrogen sulfide-rich gas is fed to a Claus plant.
6. The plant of claim 5 further comprising a third absorber that receives a tail gas from the Claus plant, wherein the third absorber is configured to promote absorption of hydrogen sulfide by a hydrogen sulfide-selective solvent, and wherein the third

absorber is configured to produce an overhead product that is enriched in carbon dioxide and substantially depleted in hydrogen sulfide.

7. The plant of claim 6 wherein the third absorber is configured to produce a third hydrogen sulfide-enriched solvent.
8. The plant of claim 7 wherein the third hydrogen sulfide-enriched solvent is fed to at least one of first and second absorbers.
9. A plant comprising:
  - a first absorber fluidly coupled to a regenerator, wherein the first absorber is configured to promote absorption of hydrogen sulfide by a hydrogen sulfide-selective solvent, and wherein the regenerator is configured to promote formation of a hydrogen sulfide-rich gas from the hydrogen sulfide-selective solvent;
  - a second absorber fluidly coupled to the regenerator, wherein a portion of the hydrogen sulfide-rich gas is fed to the first absorber to thereby increase a hydrogen sulfide concentration in the hydrogen sulfide-rich gas;
  - a Claus plant that receives another portion of the hydrogen sulfide-rich gas and produces a tail gas, wherein the second absorber is configured to receive the tail gas; and
  - wherein the first and second absorbers are configured to produce an overhead product that is enriched in carbon dioxide and substantially depleted in hydrogen sulfide.
10. The plant of claim 9 wherein the second absorber is configured to produce a hydrogen sulfide-enriched solvent, and wherein at least a portion of the hydrogen sulfide-enriched solvent is fed to the first absorber.
11. A method of increasing the concentration of hydrogen sulfide in a gas stream comprising:
  - separating an acid gas stream in a first absorber to form a first carbon dioxide-rich gas and a first hydrogen sulfide-enriched solvent using a hydrogen sulfide-selective solvent;

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separating a first portion of a hydrogen sulfide-rich product gas in a second absorber to form a second carbon dioxide-rich gas and a second hydrogen sulfide-enriched solvent;

combining the first and second hydrogen sulfide-enriched solvents;

removing hydrogen sulfide from the first and second hydrogen sulfide-enriched solvents to thereby form the hydrogen sulfide-rich product gas; and

feeding a second portion of the hydrogen sulfide-rich product gas to a Claus plant.

12. The method of claim 11 wherein the step of combining the first and second hydrogen sulfide-enriched solvents comprises mixing of the first and second hydrogen sulfide-enriched solvents.
13. The method of claim 11 wherein the step of combining the first and second hydrogen sulfide-enriched solvents comprises feeding at least part of the first hydrogen sulfide-enriched solvent into the second absorber.
14. Canceled.
15. The method of claim 14 wherein the Claus plant produces a tail gas, and comprising a step of feeding the tail gas to a third absorber that produces a third overhead product that is enriched in carbon dioxide and substantially depleted in hydrogen sulfide, and a third hydrogen sulfide-enriched solvent.
16. The method of claim 15 wherein the third hydrogen sulfide-enriched solvent is fed to the first absorber.
17. The method of claim 15 wherein the third hydrogen sulfide-enriched solvent is fed to the second absorber.